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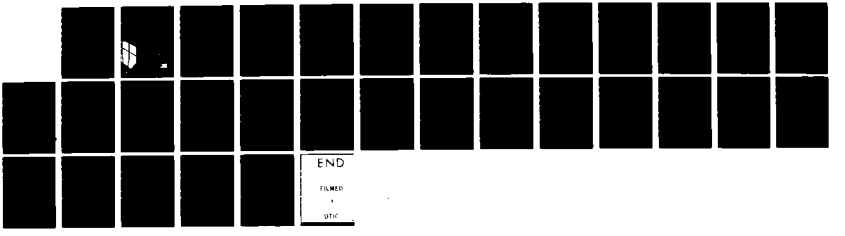

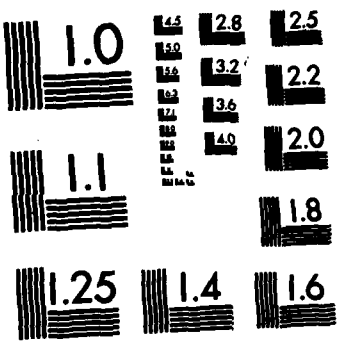

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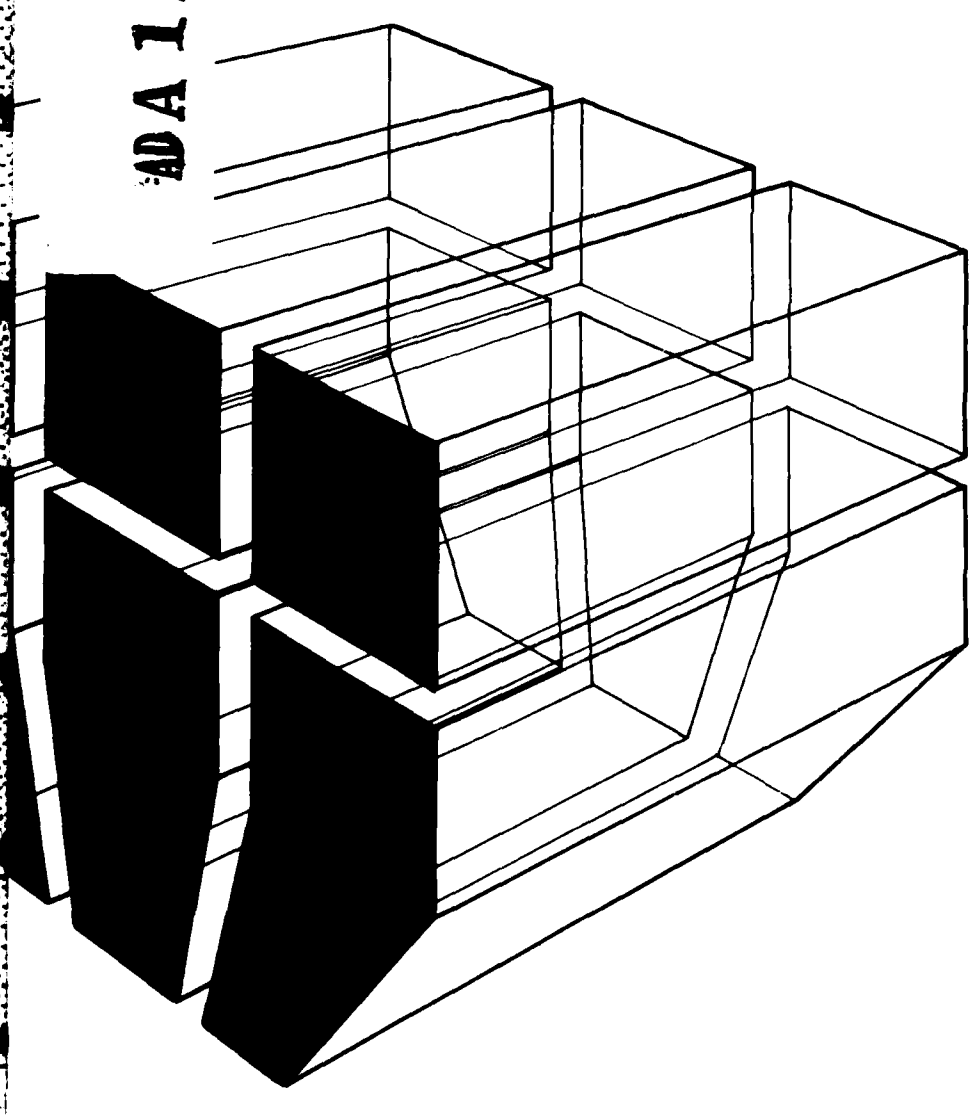
TECHNICAL REPORT N-143
January 1983
Procedures for Noise Reduction and Control

ANALYSIS OF LEGAL PRECEDENTS AND LAND-USE CONTROLS AS APPLIED TO THE INSTALLATION COMPATIBLE USE ZONE (ICUZ) PROGRAM



by
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This report describes a study conducted by the U.S. Army Construction Engineering Research Laboratory (CERL) into the legal precedents and land-use controls applicable to the Army's Installation Compatible Use Zone (ICUZ) program. The ICUZ program is designed to protect an installation's mission as well as the public by identifying heavily noise-impacted areas so local governments and the installation can use local land-use planning to minimize noise-sensitive development in areas impacted by noise from Army activities.

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It was concluded that Federal and state legal precedents indicate the Army can avoid noise-based litigation only by the concerted enactment of the ICUZ program. It was determined the most easily enacted land-use controls applicable to the ICUZ program are zoning and capital improvement, and easements and trusts. Also, the ICUZ program's success requires that an installation (1) use a broad team approach to develop the program, (2) maintain a working relationship between the installation and local land-use planning offices and elected officials, and (3) rely on an energetic public relations program to prevent negative community reaction to Army initiatives.

ANALYSIS OF LEGAL PRECEDENTS AND LAND-USE CONTROLS AS APPLIED TO THE INSTALLATION COMPATIBLE USE ZONE (ICUZ) PROGRAM

1 INTRODUCTION

Background

Most Army installation activities are by definition associated with high sound levels: firing small arms, artillery, and armor; detonating explosives; manuevering units, armor, and rotary-wing aircraft. For the Army, such sound levels are both part of the job of operating the weapons systems vital to its national defense mission and a necessary training condition, since soldiers must learn to function in an environment similar to what they will encounter on the battlefield.

Unfortunately, these sound levels sometimes reach beyond the installation to disturb those who are not participating directly in an installation exercise. When this happens, the sound levels produced by certain installation activities may be perceived as "noise."

The idea of noise as an agent which can extend the physical property boundaries of a military installation, invading or usurping the property rights of the nearby civilian community, has raised serious legal, environmental, and mission management questions for the Army. This issue is not strictly one of an arbitrary measure of excessive vs acceptable sound levels, but rather of when a sound, whatever its measured level, can be perceived as noise.

A very high sound level generated at a remote firing range is not "noisy," since it cannot be heard and therefore cannot disturb anyone other than those soldiers at the firing point. But the same sound level, if produced near an installation boundary abutting a housing development, could be considered a serious enough nuisance to bring complaints and even damage claims against an installation.

It would appear the best way to resolve all conflicts between the sound produced by Army activities and noise-sensitive land uses like residential housing, hospitals, or recreation areas would be to move all potentially "noisy" operations to remote areas of an installation. However, even on the largest Army installations, this is not always possible. Today, most installations are being asked to accommodate larger, longer-range weapons systems. In most cases, this means firing points must be put near installation boundaries to guarantee safe and secure impact areas. Also, installation sound levels are increasing as installations improve their combat readiness by training more soldiers, more often.

But the most serious pressures come from the civilian community. As these communities expand and convert the undeveloped or agricultural lands near installation boundaries to noise-sensitive land uses, conflicts may develop between the Army and the civilian community over the noise impact of Army activities.

The Army has recognized its potential noise-impact problem by instituting the Installation Compatible Use Zone (ICUZ) program. The ICUZ program is designed to protect an installation's mission as well as the public by identifying heavily noise-impacted areas so local governments and the installation can work together to use local land-use planning to minimize noise-sensitive development in areas impacted by installation noise.

The U.S. Army Construction Engineering Research Laboratory (CERL) was instrumental in developing the Army's ICUZ program; this report describes a CERL study to help installation personnel make sound and reasonable recommendations to the civilian community for controlling land use in areas ICUZ studies identify as having the potential of being impacted by Army installation noise.

Objectives

The objectives of this study were to (1) research legal precedents related to noise and its effects on land uses near an Army installation, (2) investigate and identify land-use techniques applicable to ICUZ, and (3) examine the Air Force experience with the Air Installation Compatible Use Zone (AICUZ) program.

Approach

1. Legal cases involving suits for noise damage and annoyance were reviewed for applicability to the Army and to the ICUZ program. The extent of liability and vulnerability of the Army to noise-impact litigation was inferred from military and civilian aircraft noise suits and blast damage suits.

2. Land-use control techniques in use in the United States were compiled. These techniques were analyzed to see how they could be applied to the ICUZ program. Important parameters examined were: amount of land controlled, ease of enactment, and enabling legislation.

3. The Air Force and Navy experience with the AICUZ program was reviewed.

Mode of Technology Transfer

It is recommended that the information in this report be incorporated into an Army Technical Bulletin on noise-impact control methods.

2 LEGAL PRECEDENTS

As the conflicts between Army installations with high sound level activities and civilian communities that want to expand noise-sensitive developments into areas now impacted by installation noise become more common, the civilian community may try to resolve those conflicts in the civil court. The Army's situation parallels in many ways that of airport operators and owners throughout the country, who have found themselves being sued for noise-based damages when the vacant and agricultural "buffer" zones around their airport boundaries were converted to noise-sensitive developments as the communities they served increased in size and population. Airports also have, like the Army, had to operate within the same size operational zones, yet deal with louder and larger noise sources (jet aircraft, increased traffic to meet new demands for services brought by community expansion).

Since 1950, there has been a marked increase in the number of civil suits seeking compensation for damages caused by the effects of airport noise on property values and the health and welfare of property owners and residents. Airport litigation decisions are of special interest because they (1) have set precedents which can apply to noise sources other than aircraft, and (2) sometimes have involved Air Force operations at civilian airports, indicating the perspective from which noise-producing military activities are viewed in a civil court.

The Army's status as a Government agency does not afford it complete protection from being sued. Under the Tucker Act and the Federal Tort Claims Act, a private citizen or organization can bring the Government to court if they can prove either a violation of constitutional rights or negligence-based damages.[1,2*] Three major Federal court decisions have outlined what the Army can expect to be held liable for in noise-based civil suits. A number of state court decisions, as yet unreviewed on the Federal level, indicate areas where the Army can expect to be challenged for the effects produced by installation noise.

Federal Court Decisions: Causby, Griggs, and Burbank

Causby

In 1946, the U.S. Supreme Court reviewed the case of *U.S. vs Causby* to determine whether frequent low flights by Air Force aircraft operating from a civilian airport over a poultry farm near the airport were creating noise levels high enough to destroy the poultry farmer's ability to enjoy the full use of his land. The Court ruled the noise levels produced by the Air Force overflights violated the farmer's Fifth Amendment rights by essentially making it impossible for the property to be used as a commercial poultry farm.[3]

Two important legal theories were established as applying to noise-based damages in this decision.

1. **Trespass.** The overflights made by Air Force aircraft were, in the court's opinion, a physical invasion, or trespass, onto private property. The overflight precedent raised two questions: Do a property owner's rights extend from the earth to the heavens? Does the noise source itself (separate from the sound waves produced by the source) have to pass over the property to constitute trespass?

Causby gave only a partial answer to the first question when the decision established that the overflight *and* the low altitude constituted trespass onto the poultry farm. In other words, the fact of the aircrafts' physical invasion of the property allowed the court to consider the trespass argument, but it was the *degree* of the invasion (the low altitude) which was the determining factor in deciding whether trespass had indeed occurred.

2. **Inverse Condemnation.** When the court decided that the poultry farmer's use and enjoyment of his property had been usurped by the overflights, it held that the farmer's Fifth Amendment rights had been violated by the Federal government, in this case the Air Force. Although the Federal government can demand to take over private property for public use through its powers of eminent domain, it must pay the private property owner for the land *before* public

*References are listed beginning on p 28.

use begins. If the Government does not begin legal action to compensate an owner before taking over the owner's property for public use, or fails to pay the owner for his or her property, the owner can sue the Government for the value of the property the Government has taken. In *Causby*, the court allowed the landowner to sue based on the fact the Government had, through the noise produced by the low overflights, "taken" the poultry farm without compensating the owner before it began using the property.

The court's recognition of the inverse condemnation argument opened the door to Government suits if private landowners could prove trespass had caused an actual "taking" of their property without prior notice and compensation.

Griggs

In 1962, the Supreme Court held in *Griggs vs Allegheny County* that the owners and operators of the Greater Pittsburgh Airport had "taken" the property under the airport's takeoff and landing glide paths, in violation of the property owners' rights under the Fourteenth Amendment.[4] The court established that the airport owners were responsible for buying air easements (i.e., areas which they knew would be under aircraft flight paths) in the same way as they were responsible for purchasing the land on which the airport runways were actually built. Thus, the court allowed residents under the takeoff and landing glide paths of the Greater Pittsburgh Airport to sue for and receive damages for the effects of noise from aircraft overflights, based on the inverse condemnation argument introduced in *Causby*. However, *Griggs* differed from *Causby* in an important way. *Causby* held only that noise-based damage claims, when combined with trespass, could be awarded. The *Griggs* decision took this idea a step further by establishing who was responsible for those damages.

The *Griggs* decision indicates that the owners/operators of a noise-producing activity (in this case an airport) must consider whether that activity will affect nearby land uses. It further indicates that if the owners/operators do not include such considerations when making operational or siting decisions, they may be held liable for damages.

Burbank

In 1973, the Supreme Court, in *Burbank vs Lockheed Air Terminal*, established that a local government did not have the power to enact an ordinance which would, in effect, regulate air traffic, if the local government did not own the airport.[5] The city of Burbank had attempted to decrease the noise impact of aircraft flying in and out of the Lockheed Air Terminal on noise-sensitive areas within its corporate boundaries by imposing a curfew on aircraft operations at the terminal. The court held that any attempt by a local government to regulate aircraft in flight (which would have been the actual result of the curfew) was not within the local government's police power, since aircraft flight control was the sole province of the Federal government.

In effect, the *Burbank* decision said that when the owners/operators of a noise-producing source are responsible for meeting Federal requirements for activities pertaining to that source, Federal requirements can preempt the requirements of any other, lower police-power agency.

State Court Decisions

The precedents established in the Federal Supreme Court have outlined some of the responsibilities of those who manage or control a noise source. But they are even more significant because of the issues they left unaddressed, or have opened to question. This is reflected in the dramatic increase in the noise-based litigation at the state level in recent years. None of these state cases have had their decisions reviewed by the Supreme Court. Still, state litigation is important. It often sets the standards by which the Federal court will base its decisions when it first hears a similar case. And the mix of decisions on suits brought based on the same or similar arguments virtually guarantee that a Federal precedent will have to be established at some point.

Most of the noise-based state litigation has grown from the precedents of inverse condemnation established in *Causby* and damage liability established in *Griggs*. A few significant liability- and inverse condemnation-based arguments have been denied in the state courts based on the preemption argument introduced in *Burbank*.

Trespass and Inverse Condemnation

An important aspect of the *Causby* decision was the actual invasion of an aircraft, or trespass, onto a property owner's land. *Causby* said trespass was necessary for a "taking" by inverse condemnation to be allowed. However, an Oregon state court decision *Thornburg vs Port of Portland*, has overturned this physical trespass requirement by allowing compensation to a property owner who claimed the noise

from an airport glide path near, but not over, his property was great enough to render his property unusable.[6] The state of Washington, in *Martin vs Port of Seattle,* allowed a damage award for similar reasons by declining to distinguish between "taking" and "damaging," and holding that the position of the aircraft when the disruptive noise was being produced was superfluous.[7] In 1975, in *Greater Westchester Homeowners Association vs City of Los Angeles,* the California Superior Court extended the basis for a damage award to include personal injury by awarding $86,000 in compensation to residents living near the Los Angeles airport for annoyance, inconvenience, discomfort, and mental and emotional distress caused by the airport's noise.[8]

The willingness of the state courts to widen the definition of trespass to include the physical effects of a noise source in airport noise-based litigation is demonstrated in two important New York blast-noise decisions. In *Booth vs Rome,* the state court refused to award compensation for damages caused by vibrations produced by blasting at a railroad bed site because the plaintiffs could not prove their home was "invaded" by flying rock or debris from the blasting operation.[9] The court said because blast debris did not physically invade the plaintiff's property, there was no *technical* trespass, and thus no legal ground for complaint. This decision was overturned in 1969 in *Spano vs Perini Corporation.* In this case, the New York state court allowed compensation for damages caused by a blast concussion to be awarded, even though blast debris had not physically invaded the plaintiff's land.[10]

The *Thornburg, Martin, Greater Westchester,* and *Spano* decisions indicate that, in some instances, state courts are willing to accept that the physical effects of a noise source (sound waves generated from an aircraft, blast waves from an explosion) can be considered a trespassing agent regardless of the physical location of the actual noise source (an aircraft, flying rock and debris from an explosion). Extending the trespass definition in this manner could broaden the grounds for damage compensation based on the inverse condemnation and liability precedents set in *Causby* and *Griggs.*

Preemption

In *National Aviation vs City of Hayward,* the city of Hayward was sued by the airline company which wanted to use the airport owned by the city of Hayward during times when the airline was banned from doing so.[11] The California court ruled that the airport proprietor (i.e., the city of Hayward) had the authority under Federal regulations to decide on the operational use patterns of its airport, and upheld the operational ban. Three similar cases involving the preemption concept introduced in *Burbank* have been heard at the state level within the past 10 years.

Allegheny Airlines vs Cedarhurst and *American Airlines vs Hemstead* arose near John F. Kennedy International Airport in New York; *American Airlines vs Audubon Park* occurred in Kentucky.[12,13,14] In these cases, the airlines sued the communities of Cedarhurst, Hempstead, and Audubon Park because they had established a local noise ordinance which limited, in the airlines' view, access to the airports near or in those communities. In all three cases, the local ordinances were overruled based on the preemption argument introduced in *Burbank.* The state courts held that local governments could not impose any ordinance which interferred with the authority given to the airport by Federal regulation to decide on the use and operational patterns of aircraft flying in and out of an airport.

When the state court decisions rendered in *Hayward, Cedarhurst, Hempstead,* and *Audubon Park* are considered in light of the Federal *Burbank* preemption precedent, it appears that a noise-producing activity regulated in some way by the Federal government may be protected from an attempt to control that activity, if that attempt at control conflicts with Federal requirements or regulatory authority.

3 LAND-USE AND RELATED CONTROLS

The legal precedents set at the Federal and state levels outlined in Chapter 2 indicate the civilian community could challenge the Army in civil court if an installation fails to consider whether the noise it produces could damage persons or property in the noise-impact zones near its physical boundaries. Whether such challenges would be resolved in the civilian community's favor is unclear, since the Army is both an owner/operator of a noise-producing source and a Federal agency. It is clear, however, that litigation involving Army noise would be complicated and expensive, probably requiring many test state cases and an eventual Federal review.

The best way for the Army to prevent litigation, or the threat of suit, is to avoid any situation which creates a conflict severe enough that the civilian community feels bound to seek resolution in the state or Federal court system. This approach has been adopted with much success by the Air Force (see Chapter 4), and is the reason for the Army's ICUZ program.

The long history of airport noise litigation shows that the most serious noise-impact problems arise when land uses near a noise source are incompatible with the noise impact of that source. Most airports did not face litigation until the vacant or agricultural lands near to but outside of their physical boundaries were converted to noise-sensitive developments. The experience of airport owners/operators indicates the Army must do its best to keep the land uses near its installation boundaries compatible with the mission of its installations, yet find a way to prevent the civilian community from being deprived of the full use and profit those lands can provide.

Many installation master planners have had some experience with noise-impact management, since the Army requires that cantonment areas be protected from excessive sound levels. (Cantonment residents are just as annoyed as the civilian community when exposed to high noise levels during off-duty hours.) Many installations also are experimenting with source controls, using foam, barriers, and similar methods to reduce the initial sound levels produced by demolition charges, artillery, and armor. Installations with large helicopter inventories use noise-impact contour data to find operational flight patterns that limit overflights of noise-sensitive areas.

But source controls are not a complete answer. At best, they can only lower the profile of the noise impact. They cannot eliminate it. And as training, testing, and operational demands increase, the reduction effects of source controls may be offset by the actual increase in noise-producing events.

The only long-term solution to the Army's noise-impact control problem is to combine a rigorous, on-installation source control program with agressive, off-installation land-use management. Because the Army does not own or regulate most of the areas which must be managed to prevent them from being damaged by installation noise, it must work with the civilian community to plan, develop, and implement a successful installation noise-impact control program.

Available Land-Use Control Methods

The land-use-based noise controls available to the Army are:

1. **Regulatory Control**

   Zoning

   Transfer of Development Rights

   Special Districts

   Building Codes

   Subdivision Regulations

   Federal Regulations

   Health Codes

   Disclosure of Noise Levels

2. **Public Acquisition**

   Municipal Land Acquisition

   Tax Increment Financing

   Land Banking

3. **Incentives for Compatible Development**

   Financial

   Capital Improvement Program

4. **Installation Actions**

   Purchase In-Fee

   Sale with Restrictions

   Leaseback

   Easements and Trusts

An Army installation must consider two factors before selecting any of these land-use controls to abate noise impact.

Factor 1: The *enabling legislation* of the state in which the installation resides. Enabling legislation is the means through which police powers are delegated by the state to local governments. The police powers

of a community are its authority to create and enforce land-use regulations. Enabling legislation differs from state to state, and the ability of the local governments to enact laws is limited to items within the appropriate enabling authority.[15] Therefore, it must be determined on a state-by-state basis whether particular recommended types of controls could be applied by the local government with jurisdiction. At least six general topics of legislation should be examined:

a. Planning enabling legislation

b. Regional organization and intergovernmental cooperation

c. Zoning and set-back legislation

d. Plats and subdivison legislation

e. Annexation

f. Economic and community development.

Factor 2: The *level of sophistication* of the local government structure and the planning agency. This degree of sophistication or capability will play a role in determining the type of techniques that will work. The methods most likely to be acceptable to local governments are those compatible with existing government programs, e.g., using an existing office to oversee the program or strategy instead of creating a new office.

Regulatory Controls

Zoning

Zoning is an exercise of the police power that allows communities to enact legislation protecting the public health, safety, morals, and general welfare of its citizens. Each regulation in the zoning ordinance must bear a reasonable and substantial relationship to these objectives, or it will be found to be in violation of the "due process" clauses of state constitutions and the U.S. Constitution.*[16]

*Due process clauses are the Fifth Amendment pertaining to the Federal government, and the Fourteenth Amendment which protects people from state actions. There are two aspects: procedural, in which a person is guaranteed fair procedures; and substantive, which protects a person's property from unfair government interference or taking. There are similar clauses in most state constitutions.

Power to zone is usually determined by municipalities from the state legislature's enabling legislation. It is therefore necessary that the zoning ordinance not only meet constitutional standards, but also the legislative requirements in the state enabling act, as related to the substantive provisions and procedures followed in the ordinances' enactment and administration. There are many reasons for enacting zoning ordinances. Among these are: control of land uses, density and bulk controls, regulation of signs, control of accessory uses and home occupations, control of nonconforming uses, aesthetics, and open space preservation.[17]

Zoning is distinguished from other regulations because it differs from one district to another, rather than being uniform throughout the municipality. This unique characteristic of zoning can lead to the possibility of arbitrary and discriminatory treatment of an individual's property by the local legislative body. State legislatures, perceiving this danger, have imposed restrictions on local legislative power in the zoning enabling acts.[17] Limitations that have been imposed include:

1. Within a district, the regulations must be uniform for each class and kind of building; i.e., the restrictions in a certain type of residential zone must be the same everywhere that zone occurs throughout the municipality.

2. There must be a reasonable basis for classifying particular areas differently from others.

3. The zoning ordinance must cover the entire jurisdictional area of the city instead of singling out one area and leaving the rest of the area unrestricted.

4. The regulations must be reasonable in their application to particular properties; i.e., the property must be able to physically accommodate the use. Zoning a frequently flooded area for single-family residences is an example of an unreasonable zoning.[17]

Zoning ordinances should be prepared in accordance with a comprehensive plan. In the past, there has been a weak link between these two elements of local planning. For several decades, the zoning ordinances were enacted and revised with little regard to a comprehensive planning process. Until recently, the adoption of a zoning ordinance was usually preceded by an inventory of land use which was then marked on a map of the city. The zones were then delineated

based on the recommendations of consultants, the feelings of the decision-makers, and political pressures. There now exists a movement to tie zoning ordinances more closely to the comprehensive plan.

A zoning ordinance consists of a text and a map or series of maps. The text gives the substantive standards that are applicable to each district and the procedures that govern proposals for change in the text and the map. The map allows the public to identify where the districts are, and therefore what sections of the text of the ordinance are applicable to an individual's property.

Excluding Incompatible Uses. Land within a noise-impacted area can be successfully zoned for use compatible with the noise source if the community has a noncumulative type of zoning law.[15] Under cumulative zoning, zones are ranked in some low-to-high use sequence such as heavy industrial, light industrial, commercial, multifamily residential, and single-family residential. This can be illustrated as a pyramid (see Figure 1). Any use permitted in a high-use zone such as single-family residential is allowed in lower use zones such as light industrial, commercial, or heavy industrial. Noncumulative zoning allows no uses other than those specifically permitted in a given zone.

The existence of cumulative zoning does not mean that the exclusion of noise-sensitive uses is impossible. Each community's zoning ordinance should be examined to find out what uses are allowed in the zones. Not all higher land uses are automatically permitted in the lower use zones.

A problem with using zoning to exclude incompatible land uses in all impacted areas is the possibility of overzoning for a particular use. When overzoning occurs, there may be areas that remain underused for some time. Another factor to consider is whether the establishment of a zone that excludes noise-sensitive uses would be compatible with the other plans of the community for orderly growth and development or in conflict with development patterns of adjacent communities.

Administering the Zoning Ordinance. Zoning ordinances and their administration will vary in each municipality or county within the bounds of the state's enabling act. Traditionally, several governmental bodies have been empowered to make or influence decisions: the planning commission, the local legislature, and the board of appeals. These bodies are typically responsible for considering requests for changes in applicable zoning rules. In some states, a zoning commission is responsible for preparing the original zoning ordinance, and not directly involved in requests for changes in the rules.[17]

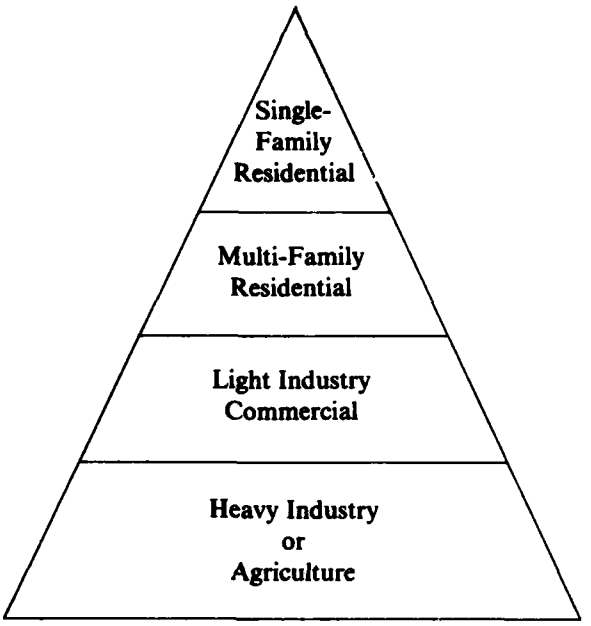

Figure 1. Cumulative zoning.

Each of these agencies have separate functions. The board of appeals has two tasks: to grant variances in the regulations in "hardship" cases and to hear appeals from interpretations of the ordinance. The latter occurs in cases where a permit has been denied because the permit official felt the development was in violation of a zoning regulation.

The function of the local legislature (in most states) is to enact amendments to the zoning ordinance text or map.

The planning commission's responsibility is to hold the public hearing that is mandated by the state enabling act on a requested amendment, planned unit development, or conditional use and to make recommendations to the local legislature.

In recent years, cities have used several new administrative techniques to more efficiently and effectively administer the zoning ordinance. These new techniques include an Office of the Zoning

Administrator and an Office of the Zoning Hearing Examiner.

The Office of the Zoning Administrator has been in existence for some time in a few large cities such as Los Angeles, and is currently being tried in other large cities. The reason for creating this office is to consolidate all the different aspects of zoning administration. Duties that this office may perform can include processing building permits as they pertain to zoning, serving as staff to the board of appeals, and being responsible for the publication and serving of notices that are required. In some cities where law permits, the Zoning Administrator may also grant minor variances in cases believed to be too insignificant to be placed on the agenda of the board of appeals.[17]

The position of the Zoning Examiner involves the hiring of a qualified person to hold hearings on requests for change, to take evidence, make findings of fact, and to make recommendations on decisions to the local legislature. This office essentially relieves the planning commission of the duties of the hearings as well as greatly improving the conduct of the hearings and the quality of the findings.[17]

One other type of administrative technique that has not really been fully implemented by any city is that of the neighborhood zoning authority. Some cities have taken steps toward allowing the neighborhood to have more say in the matter of rezoning, such as the administrative practice of referring an application for rezoning to a community group. But as of yet, there has been no delegation of actual decision-making power to neighborhoods. It is feasible that within the next decade there will be a more formal role for neighborhood participation in the zoning process.[17]

Changes in Zoning. Three types of changes can be made to a zoning ordinance: variances, amendments, and conditional uses. Variances are essentially a variation from the restrictions within a certain zone. Variances are only granted when the restrictions are causing a "hardship" for the property owner. An example of such a hardship would be if the shape of a lot precluded it from being built upon because it could not meet yard requirements. Thus, variance is a way to relieve an unfair practice in a particular case.

There is little guidance provided to local administrators by the state legislatures regarding variances. Terms such as "particular difficulties" and "unnecessary hardship" have generally been the only standards. Thus, variances have become a means of relaxing zoning regulations in a broad manner. Because of this practice of liberally granting variances, some municipal councils have sought to prohibit them if the state enabling act allows.[17]

Amendments to a zoning ordinance may come in three forms.[17]

1. Revision of the entire ordinance after re-examination of the factors on which the original ordinance was based and a review of subsequent problems.

2. A minor amendment of specific provisions or of the zoning map in response to situations that arise during the administration of the ordinance.

3. Amendments (usually to the zoning map) that are designed to include newly annexed property.[17]

Every proposal should be examined from the aspect of the community view, and not from the standpoint of only a few landowners. Amendments that are favorable to only a few are known as "spot zoning" (the granting of rezoning that singles out a small parcel for classification different from surrounding property). Such zoning will more than likely be declared invalid if brought into court.

Conditional or contract zoning is often a bothersome aspect of the amendment process in some jurisdictions. This problem arises when an applicant for a rezoning states that if they are granted a map amendment, they will undertake a specific use. There may be no objection to the specified use within the newly rezoned district. However, the new district may include other uses that the city council or planning commission may not wish to see located there. To ease this problem of developers not building what they have promised, some municipalities have begun to try binding the developer, as a part of the rezoning or amendment process, to promise to actually do what they have stated they would do.[17]

In such cases, the zoning map will show that land is classified in a certain manner and therefore subject to only the regulations in the text applicable in that district; however, an additional document which is not part of the zoning ordinance places additional restrictions on the use of the property. The restrictions may take several forms: a covenant in a deed, a resolution of the city council to which the applicant

for rezoning files a written consent, or a written agreement between the municipality and developer. The legitimacy of contract zoning must be investigated in each state, because not all states have upheld its validity.[17]

The need for conditional uses was realized during the boom of urban growth in the 1950s. It became apparent that there were land uses that were necessary within residential areas, yet could overpower the residential character of the area. Neither amendment or variance procedures appeared applicable, therefore the conditional or special-use category was introduced. This category recognized uses that were necessary but had to be reviewed to make certain their design and location did not intrude upon the neighborhood's predominant residential uses. In recent years, these conditional uses have come to include gas stations, trailer parks, and halfway houses.[17]

New Substantive Regulations. Within the past two decades, the text of the zoning ordinance has changed from the apparent rigid and inflexible districts by acknowledging the fact that the municipality may be prepared to bargain on terms of permissible development. Several types of substantive regulations have been used: planned unit development (PUD) and clustering, transfer of development rights, and special districts.[17]

PUD and Clustering. Clustering is usually limited to residential development. Homes are concentrated in small groups with the major portion of the tract remaining in open space. Such clustering permits a higher density if the resulting open space is legally permanently open.[17] This is usually done by allowing smaller individual lot sizes than zoning normally allows, but with the provision that the number of units is not to be increased over that designated in the density regulation. The incentives for developers in cluster developments are having to construct fewer and shorter streets and being able to create more marketable (i.e., lower cost, or more attractive) lots. The municipality gains from decreased public costs for road maintenance, shorter school bus routes, and fewer miles of police patrol. They also have the permanent open space at no cost.[11]

The PUD can be thought of as a way to adjust development to fit the characteristics of a site or a means to insure a better design and additional open space.[13] It can be applied to commercial and industrial as well as residential development. In relation to the zoning ordinance, the PUD provisions in the ordinance text provide the developer an opportunity to develop land in a way that would not fit the usual use, bulk, and open space requirements of standard zoning districts.[17]

The PUD concept will usually provide incentives for the developer. Without incentives, the long process of obtaining permission for such a development would be prohibitive. Incentives may include the chance of obtaining more dwelling units than normally allowed under existing zoning as well as mixture of single-family and multifamily units, or the chance to incorporate small retail uses in the residential district. A third incentive is simply the opportunity to develop an area without the strict yard and setback requirements of most residential zones. In return for these opportunities, the developers may be required to provide community facilities such as land for schools or recreational facilities as part of the development.[17]

PUDs have three major characteristics:[17]

1. They are usually associated with large-scale projects.

2. They typically involve a mixture of uses. Single uses usually fall into the category of a typical subdivision.

3. They customarily involve phase-by-phase development over a relatively long period of time. During this time, buildings, uses, and arrangements may be replanned to meet changes in requirements, technology, financing, or changes in the concept itself.[17]

Whether the cluster and PUD concepts are permitted depends on the state enabling statutes. Actually *requiring* that a tract of land be developed as a cluster or PUD may be unauthorized. The decision to use the cluster or PUD concepts must be left up to the developers. Proper incentives can motivate the developers to choose the cluster and PUD options.[15]

When viewed in application to the Army's particular situation, the effectiveness of cluster developments or PUDs depends on how much noise is being produced, the physical site characteristics, size of the development and the area, the demand and market for this type of development, and how far the

proposed development is from the installation. The final variable is the design of the development itself. Development concepts may be only partially effective in attenuating the annoyance effects of noise and vibration.

Transfer of Development Rights

The purchase of development rights is a tool which can be used to prevent incompatible uses. Property rights can be described legally as a "bundle" of rights that can be separated. Instead of simply separating the development rights from the rest of the owner's rights so they cannot be used, transfer of development rights (TDR) allows these rights to be used elsewhere. The land to remain undeveloped or in agriculture can have its value assessed according to what it would be worth if it could be developed to determine the value of the development rights.[18] The right to develop can be sold to someone else and the proceeds of the sale viewed as compenstion for not allowing the property owner to develop his or her property. TDR therefore offers a landowner, whose right to develop has been restricted, an opportunity to sell those rights to a landowner in an area where the local government is ready to allow development.

The units of rights to be transferred need not be measured in monetary terms. They can be evaluated in terms of floor space or dwelling units. Measured in this way, development rights can be transferred to allow the owner of the land to develop on another parcel that he or she owns at a higher density than is normally allowed. It is not necessary that the development rights be transferred to different owners; they can be transferred between parcels owned by the same person.[18]

For TDRs to be effective, there must be the potential of additional community development. It is this additional potential to develop that is sold. One of the difficulties with TDR is keeping track of the rights that have been transferred, where they have been transferred, and to whom (if they have exchanged hands). To handle this concept effectively, the local government structure must be well organized and efficient. Even large cities may have problems in administrating this procedure.

The preservation of open space could be one of the Army's goals in using TDR. The owners of the land to remain undeveloped or in agricultural production could sell their development rights to owners of developable land. Through this sale, the owners of the undeveloped land receive compensation for their right to develop in the future. Using this system, three goals are accomplished: there is preserved open space, the owners are compensated, and there is no direct major cost to the local government.

Special Districts

Not all the noise-sensitive land uses impacted by training noise will occur neatly within existing district boundaries. Impacted areas may cross the boundaries of several districts, or perhaps only portions of several districts. To simplify the designation of districts which should not contain these sensitive uses, an overlay zone could be created using noise contours provided to the installation by the Army Environmental Hygiene Agency (AEHA). An overlay district is a special-purpose zone superimposed over conventional zoning districts.[16]

In the Army's case, the overlay zone would include Zones III and II of the ICUZ program.* The area within this overlay zone would be subject to the regulations of the regular zone in which it lies, as well as the regulations of the overlay zone. This technique may have fewer problems legally and administratively than the creation of a separate series of special zones in the noise-impacted portions of the community.[16]

Building Codes

Building codes can include additional specifications for acoustical construction practices. Among the different forms of building code requirements, three are applicable when dealing with high noise levels:[16]

1. Requirements for specific construction techniques.

2. Requirements for specific noise attenuation characteristics in terms of a mandatory Sound Transmission Class (STC).

3. Specification of certain noise levels after construction (usually in terms of maximum noise levels in certain rooms).[16]

The key to writing an effective noise compatibility section to the building code is to make it strong

*In the ICUZ program, Zone II is normally considered unacceptable for noise-sensitive uses and Zone III is always considered unacceptable for noise-sensitive uses.

enough to be enforceable, yet discretionary enough to be adjustable to meet the situation. One way of doing this is to define the specific requirements as being applicable only to those areas where the actual or specific noise levels exceed a set level.[16] People may question the fact that they must pay the extra costs of special construction techniques while the noise source continues unabated. The defense of such requirements lies in the fact that the purpose of the Government activity is to protect the health, safety, and welfare of the public.

When specific techniques are required, zoning ordinances and building codes must be coordinated. The zoning ordinance can designate the areas where buildings will require noise attenuation features. To insure that these construction restrictions are complied with, occupancy permits can be required. Before the occupants can move into the building, the local authority responsible for the occupancy permit must certify that the building meets the minimum standards for acoustical levels.[16]

A problem that this local control does not address is annoyance caused by the vibration of plates, windows, and other indoor objects. Sound insulation, double-glazed windows, or air conditioning do not prevent such vibrations.

Requiring noise attenuation construction methods in the building code is the minimum measure that the local government could take towards reducing the impacts of the Army noise. Building codes do not restrict the type of use. They only insure that certain criteria and conditions are met during the construction and occupation phase. They do not address the problem of noise in the outside environment.

Subdivision Regulations

Land subdivision is simply the division of a parcel of land into two or more parcels. The responsibility of regulating such subdivisions has been delegated to the local governments by the states.

Standard zoning normally applies to individual lots, while subdivision regulations govern the way those lots are created out of large tracts of land. These regulations also cover site design, the relation of the subdivision to the rest of the area, and the allocation of facilities costs/dedication and fees.[17]

Administration. The administration of these regulations is more involved than that of a zoning ordinance. Subdivision regulations provide general standards (based in part on local plans), as opposed to explicit rules and guidelines. The local planning commission or governing body must interpret situations and apply the standards at the time of subdivision to the preliminary or final plats that are submitted by the property owner.[17]

Using the Regulations. Noise performance standards could be written into the regulations to control the types of land use.[19] These particular noise performance standards would apply specifically to those developments located within the overlay zones (if there are superimposed districts) or within Zones II and III of the Army's ICUZ program (if there are no superimposed districts).

Since subdivision regulations pertain only to the land and how it is developed, interior noise standards are not applicable. Buffer strips and noise barriers are two site design requirements often written into a subdivision regulation. Both techniques can be used in noise-impacted areas.[15]

Buffer strips required by subdivision regulation or dedicated by developers for noise attenuation purposes are usually large areas of open space between the development and the noise source. This technique is most applicable to areas where there are large lot requirements, thus decreasing the probability of creating a hardship.[15]

The use of the buffer on the development site may not be the best solution from either the Army's or the developers' point of view. The buffer that is typically required of most developers may not be adequate protection from the noise emitted from Army training ranges. CERL has determined there should be at least a 2-km buffer zone between heavy artillery ranges and noise-sensitive uses. A 1-km buffer is sufficient for light artillery. However, these distances depend on how often a range is used. If a range has a high frequency of use, a much larger buffer may be necessary. Buffers this large could run afoul of the "taking" issue, since they may create an "undue hardship" for the private landowner.

Barriers are useful for attenuating ordinary noise sources, but not very effective for use with the high-amplitude impulse noise because such noise often is focused over the barrier to the other side. Thus, the use of a barrier or berm is only a partially effective means of protecting people from the effects of impulse noise.

Construction of earthen berms during the development of a residential division can be incorporated into the subdivision regulations. Large non-residential development can be protected by berms or barriers if the requirements and stipulations are written into the requirements for the applicable development or building permits.[17]

Whether a noise compatibility element can be required as part of the subdivision plat submittal process, acoustical site planning, or architectural review depends on the state enabling legislation.[17]

While the subdivision regulations may require acoustical site design that attenuates noise, such regulations do not address the vibration issue. Neither are they meant to keep persons out of noise-impacted areas. Subdivision regulations could be used when a development is already proposed to help attenuate some of the exterior noise by using buffers and site design.

Federal Regulations

The Veteran's Administration (VA) and the Department of Housing and Urban Development (HUD) include noise as a factor when considering whether their agencies will help with new construction. The policies of both agencies follow Department of Defense (DOD) guidelines on the release of ICUZ study results; i.e., that loans cannot be granted for new construction in areas identified as unacceptable noise zones (Zone III in the ICUZ program). New construction is discouraged in areas identified as normally unacceptable noise zones (Zone II in the ICUZ program).

HUD does not deny support for the resale and purchase of existing structures in noise-impacted zones, but does consider noise as a marketability factor for determining the amount of insurance or other assistance the agency can offer.

In most communities, less than 5 percent of existing construction would be subject to VA or HUD policies regarding noise impact.

Health Codes

In communities that do not have zoning, or in situations in which the community does not wish to use the existing zoning ordinance, the health code can be used to protect persons from noise impact. Noise standards can be added to an existing health code. This code would apply to all new noise-sensitive uses within the community's jurisdiction. Such standards could mean that a developer might have to use the land for something other than land uses considered to be noise sensitive, or design them in such a manner to include noise control features. When the code simply requires noise control techniques, there would be a permit issued that sets certain conditions the structure must meet in order to be constructed in a noise-impacted area. The final permit would be based on the developer's plans for mitigating the noise and their actual performance in meeting the standards.[15]

Any permitted design would have to be able to attenuate vibration as well as noise. Currently no such design exists.* Installation personnel should be aware that health codes have been used as a type of "enabling" tool for establishing local noise ordinances. It is conceivable that the installation might have to adhere to a local noise ordinance.

Disclosure of Noise Levels

When persons move into a community, few are aware of its existing noise levels. To inform future buyers, a noise-level disclosure system could be established. It would be up to the local government to decide whether to draft a separate disclosure regulation, or to include noise disclosure requirements in an existing regulation. Disclosure could be handled in several ways:

1. Inform local real estate agents, who would be required to inform future buyers of all noise-impacted areas.

2. Put the noise contours of the installation within the deed itself. (However, contours often are not noticed until the land is already purchased.)

3. Publish noise contours on all municipal maps and subdivision plat, land-use, and zoning maps.

The disclosure of noise levels in and by itself will not prevent incompatible uses, but it could discourage people from buying property in noise-impacted areas and perhaps keep the density low.

*Research is being conducted at CERL on ways to reduce the vibration in buildings.

Public Acquisition

Municipal Land Acquisition

The most effective way to prevent any incompatible land use is through acquisition of the land. A community must consider two factors when deciding whether a policy of land acquisition is suitable to its needs: (1) the dollar cost of the acquisition and (2) the costs and benefits associated with the ownership of the land.[15]

Acquisition Costs. In a land acquisition, the main cost to the community is the price of the land. If municipal bonds are used to finance the purchase, the interest must be included in the total cost. Other "hidden" costs may include:[15]

1. Fees associated with the transfer of land, including legal costs, surveys, and land transfer taxes.

2. Property maintenance.

3. Capital improvement costs, repairs or demolition of structures on the property, and security costs like fences and lighting.

4. Tax loss.[15]

The chief factor that determines the acquisition cost to the community is the type of acquisition that is used: (1) negotiated purchase, (2) the use of eminent domain powers, or (3) dedication of the land under subdivision development.[15]

Costs and Benefits. Along with the actual dollar outlay of the initial costs, there are costs and benefits associated with continued public ownership of the land. These continued costs and benefits can be grouped into five basic elements.[15]

1. Tax loss (because land is removed from the tax roll).

2. Loss or gain in value of alternative uses of the land.

3. Loss in terms of private projects not undertaken.

4. Gains in noise compatibility.

5. Savings in terms of municipal services not required.[15]

The acquisition of noise-impacted land by the community would provide the Army with an acceptable solution. However, it is questionable as to whether the communities would wish to extend the funds to cover such a project. To make public acquisition more acceptable, the purchased land could be developed with appropriate uses and financed through tax increment financing (TIF).

Tax Increment Financing

TIF is most often used for financing urban renewal, but it can also be used to develop land compatibility with other uses. After designating the tracts of land to be developed, the municipality solicits appropriate developers (commercial or industrial) for the area. If necessary, the community may buy the land itself and make improvements. Funds to make the purchase and improvements are obtained by selling revenue bonds. At such a time, the assessment base for other taxing bodies that have jurisdiction over the area is frozen at the existing level until the bonds are retired. The value of the property increases as improvements are put in and development proceeds. The increased value of the land is taxed at the same annual tax rate of all the taxing bodies, thus producing the increment funds used to retire the bonds. Once the bonds are retired, the increment increase from the taxes can be used by other services in the community.[20]

Land Banking

Land banking can be broadly defined as public or publicly authorized acquisition of land to be held for future use to implement public land-use policy. The general nature of the future use of the land may or may not be known at the time of the acquisition.[21]

It is up to the local government to define the extent to which land banking will be used. Land banking can range from the advance acquisition of a single parcel for a specific use, to a large-scale acquisition that has no specific purpose at the time of the acquisition. Some governments are already practicing land banking through actions such as accepting school sites, roads, and parks dedicated by developers before subdivisions are developed.[22]

Often land banking is confused with permanent acquisition. However, it only places land in a temporary holding status to be turned over for development at a future date. There is no need for a permanent loss of public funds. The money can be recovered when the site is developed. It is important to remember that land banking is only a temporary expenditure of the local government. The cost of the original purchase can be recovered and transferred into the cost of a future public or private use.[22]

The authority to implement a land banking program must be in the state's enabling legislation. It is likely, however, that the local government will not have full legal authority. Acquiring land without an advertised specific purpose may be prohibited. Acquisition of sites for schools, parks, housing, and water and sewer lines may be the designated function of a special purpose authority.[22]

Existing state legislation may not allow local governments the authority of direct general purpose acquisition. Because revising existing legislation to give local governments the power to create a land banking agency is a long, difficult process, an alternative is to develop an administrative program based on existing legislation. An example of such an alternative is the establishment of a revolving fund from which the governing body could make loans to its various community development authorities. These development authorities would then purchase the land. This type of approach is not as effective as a direct general purpose program, but it does provide the local government with a means of getting limited land banking accomplished.[22]

Land banking can benefit a municipality because the municipality can use it to promote orderly growth. This can be done by buying the land before it is actually needed, and before development value is attached to it and speculation begins. By purchasing tracts of land before they are developed, the land can remain undeveloped until there is a use specified that is compatible with the local land-use policy.[22]

This technique can benefit an Army installation if the local government agrees to work with the installation. One of the many attributes of land banking is that large tracts of land can be assembled. Large tracts with one owner can be developed with compatible land uses more easily than multiple small parcels with many owners. Large assemblages of land can be used as industrial parks, commercial centers, or open space.[21] It is possible that large enough tracts of land could be used for limited residential development. This would be allowable if the development occurs on a portion of land away from the installation. The remaining land would then be left as a buffer area or developed with compatible uses.

Incentives for Compatible Development

Financial

To further interest developers, financial incentives in the form of tax reductions may be an effective tool. Municipal tax incentives may consist of:[15]

1. Tax undeveloped and agricultural land as such, instead of taxing the land as future developable lots. This is called preferential assessment and provides incentives to the owner to keep land undeveloped or in agricultural production.[15]

2. Lots within the noise-impacted area could be assessed at a flat rate (not dependent on size) rather than on a per square foot basis. Depending on the rates, this would encourage larger lot sizes, which make onlot buffer strips more feasible. A benefit for the Army of large lot sizes would be a reduced density. This would mean that fewer people would be impacted by the training noise.[15]

3. The additional cost and value of noise abatement features can be assessed at slight or no value, or the owner could be given a tax credit.[15]

The most desirable of these methods from the Army's perspective would be the assessment to discourage development. Commonly, local taxation policy has the opposite effect. It often encourages and may even force the development of land.

The usual procedure is to tax some percentage of the market value, but a popular policy is to tax undeveloped and agricultural land at its agricultural value. This creates the broadest tax base possible. The logic behind this policy is the ability to raise a given amount of revenue with the smallest tax per dollar of assessed value.[15]

The high taxes on undeveloped and agricultural land may force the owner to sell the land to a developer to escape the financial burden taxes impose. If it is to the community's benefit to retain areas of undeveloped and agricultural land, the object of the local taxing policy should be to keep taxes on undeveloped and agricultural land as low as possible rather than assessing it according to its highest and best use.[15]

Using tax incentives to encourage nondevelopment of land is not without its problems. These problems need to be addressed and a solution found if tax incentives are to work. The problems fall into three areas: legality under state laws, equity, and public acceptance.[15]

State Laws. The laws governing incentive assessment or preferential assessment will vary. In states that require "full and fair evaluation," without any exemptions, of undeveloped land, this type of incentive may be illegal. Even in states that allow specific exemptions there is a question as to whether the scope of the exemptions can be expanded to cover open spaces, undeveloped land, or wooded areas. Thus, the legality of this technique must be evaluated for each state.[15]

Equity. A second problem associated with incentive or preferential assessment is the equity with which it is applied. If this assessment policy is applied to the undeveloped and agricultural land in high-noise areas, it may be necessary to apply it to all such land throughout the community. Another question that must be addressed is whether universally applying this type of assessment is compatible with other municipal goals. This must be answered on a local basis.[15]

Acceptance. Probably the most common problem that arises is public acceptance. Any lowering of the assessed value of property would mean a narrowing of the tax base. This would mean that the tax rates would have to be increased, assuming the amount of money to be raised through taxes has not changed. Increased tax rates are never enthusiastically accepted.[15]

To increase the chances of the public accepting this method of assessment, it should be pointed out to the public that this may actually prevent much greater tax increases in the future. This is especially true if the cost of providing municipal services to new developments is greater than the additional tax revenues that would be generated by new developments.[15] Another argument for lowering assessments is that of the desirability of retaining open space near the community as well as protecting residents from the annoyance from high-noise levels.

Capital Improvement Program

The extension of municipal services into undeveloped land and agricultural areas often indicates that development will soon follow. Development usually occurs where capital improvements have been located. These areas are more attractive than areas without improvements because they save both money and time for the developer. If such facilities as water and sewer lines are designated for an area in the future, property owners having land along the designated lines can legally demand service in the future. To avoid the possibility of incompatible uses, local governments should avoid extending capital improvements into high-noise areas or even designating them for such areas.[19]

A capital improvement program must be coordinated with the zoning ordinance by the community. If an area is shown on a zoning map as containing no residential development, yet services have been extended into the area, it may be difficult or impossible to deny a rezoning request. Therefore, limiting capital improvements does not substitute for zoning, but complements it.[19]

Installation Actions

If these techniques do not appeal to the surrounding communities and local governments, there are still several actions open to the installation. They will, however, require the expenditure of time and money on the part of the Army. These actions include: purchase in-fee, sale with restrictions, leaseback, and easements and trusts.

Purchase In-Fee

Purchase in-fee is a very straightforward technique. It consists of acquiring additional land that can be used as a buffer. This is a satisfactory solution but there are two limiting factors:

1. **The attitude of the local residents.** Often, people in the communities, especially farmers, do not want the installation to purchase additional lands because it would mean removing land from agricultural production. At least one installation has received complaints about land being removed from the tax rolls.[23]

2. **Executive Order 11724.** Under this order, a major effort was begun to reduce Federal property holdings to a minimum. The General Accounting Office (GAO) is responsible for surveying the real property holdings of executive agencies. These surveys identify properties not utilized, under utilized, or not being put to optimum use. Such surveys do not recognize the need for noise buffer areas, so land that is essential to maintain operational capability may be determined as excess.

Sale with Restrictions

The restricted sale approach gives the Army control over the use of lands, but relieves it from the responsibilities of full ownership. The Army purchases fee-simple title on a parcel of land, then

restricts its resale to a private owner by stating what uses will not be permitted. This approach also restricts any future owner's right to object to noise. This allows the Army to control the land's use, yet adheres to the Army policy of not keeping excess land. The taxable market value of the land would have to take into account the nonpermitted uses and lack of rights to litigate against defined types of noise.

Leaseback

An alternative to restrictive sales is for an installation to purchase a parcel of land and lease it with restrictions on the permitted uses. The permitted uses would include agriculture, industrial, open space, and perhaps commercial facilities. Leaseback, however, still keeps land off the tax rolls. A solution to this problem would be an agreement whereby the Army would pay an amount equivalent to the amount of taxes from the receipts of the lease. Purchases for restricted sale or leaseback would probably only occur in extreme cases of incompatible land uses, when other methods had failed. This method would allow the Army flexibility in case of any future mission changes on an installation.

Easements and Trusts

The major advantage of an easement is that it is a much less expensive means to achieve control of the land. Easements are obtainable through such means as purchase, eminent domain, transfer from Government agencies, gifts, and subdivision regulations. The lower cost of the easement is due to the title and primary use being retained by the original owner.[15]

Restrictive easements are one of the most common means of avoiding the possibility of inverse condemnation without having to purchase the land outright. When a restrictive easement is purchased, the landowner may only use the land in ways not prohibited by the easement. This may include the owner being prohibited to build on the land altogether, or being prohibited from building noise-sensitive uses.[15]

The purchase of a "noise" easement is another alternative. This type of easement allows a certain amount of noise or vibration from the noise source (i.e., the Army installation) to affect the property. The purchase price of the easement would compensate the owners of the property for the inconvenience that the noise or vibration caused. The purchase of a noise easement is not as costly as buying the land fee-simple, and would restrict future purchasers of undeveloped land from litigating against the Army for the designated amount of noise or vibration.

The selling of an easement presents several benefits to the landowner. Within the easement agreement, a reduction in property tax may be a condition. This reduction would reflect the decreased value of the property because of an easement. The second benefit comes in the form of income tax reductions. If the easement is donated, the owner may deduct the complete value of the easement as a "charitable contribution."[15]

The actual cost of an easement to the Army or community depends on the terms in the easement agreement. The price paid depends on the value of the property rights that the owner is giving up. If the easement does little to change the allowable use of the land, the cost should be low. On the other hand, if the easement places severe restrictions on the possible uses, the cost could be near the actual purchase price of the property.[15]

A conservation trust is a variation of the restrictive easement. With such a system, the landowner *gives* land to the community to be held in a conservation trust for a specified period of time. Because this land is to be in trust for a set amount of time, the owner retains residual rights to the land as a long-term investment. If there is a local conservation commission or similar agency, the commission may become the holder of the land. While this land is in trust, no property taxes are paid by the owner on the parcel. The owner holds the residual rights for future use and is guaranteed that the land will not be developed. This is particularly helpful in areas where farmers are being pressured to sell their land to developers. Perhaps the most important incentive is that of a reduction in income taxes. Because the trust is considered to be a contribution, the land's assessed value can be deducted from the landowner's income taxes.[17]

Easements can be purchased by either the community or the Army. The requirements of an easement that would best benefit the public and the Army would be a restriction on the development of noise-sensitive areas. Applied to agricultural land or undeveloped land, conservation trusts could prove to be an effective way of providing a buffer area.

Summary

Any of the land-use controls described in this chapter will work. To decide which are best suited to

a particular situation, the results of each installation's ICUZ study must be carefully reviewed to pinpoint existing incompatible land uses and indicate areas that will become incompatible if opened to noise-sensitive development.

The nature of noise impact is such that it is almost impossible to eliminate after it occurs. As shown in Table 1, the controls available for reducing existing noise impacts, although effective, are limited. However, many options are available to the installation and community dedicated to preventing noise-impact problems.

Of the preventive controls listed in Table 1, the ones that should be considered first are zoning, capital improvement, and easements and trusts.

Zoning and Capital Improvement

Zoning and capital improvement can affect large areas of land, which makes them the most promising land-use controls for dealing with noise impacts. Since they are usually well established in most communities, it is relatively easy for them to incorporate ICUZ program considerations.

After the release of an installation's ICUZ study results, the installation and local governments should examine the community's most recent zoning maps to find what current or planned developments are or will be incompatible with the noise-impact profile of the installation. Then, capital improvement plans underway or approved should be compared with the zoning map to predict how zoning will change in the coming years.

This process defines existing or potential conflicts between the civilian community and an Army installation. Local governments and the installation then can work together to adjust zoning or capital improvement to avoid noise-impact problems.

Easements and Trusts

Zoning and capital improvement decisions are entirely within the jurisdiction of local governments. The Army can only suggest, through an energetic public relations program, ways to amend these programs. Of the direct land-use controls the Army can select, the most easily enacted and least complicated are easements and trusts. These controls affect large land areas, are usually compatible with Army policy, and may be very effective in influencing how lands outside of an installation's boundaries can be developed.

Table I
Land-Use Control Summary

Currently Not Applicable	Reduce Impact	Reduce Amount of Noise-Sensitive Development
Building Codes	Subdivision Regulations	Zoning
	Noise Barriers	
	Buffer Strips	Noise Disclosure
	Planned Unit Development	Health Codes
	Cluster Development	Capital Improvements
		Transfer Development Rights
		Tax Incentives
		Tax Increment Financing
		Leaseback and Sale with Restriction
		Purchase Fee-Simple

4 AICUZ PROGRAM REVIEW

In 1973, DOD instituted the Air Installation Compatible Use Zone (AICUZ) program to help DOD air installations meet the requirements for air safety and noise-impact control mandated by public law, including the Noise Control Act of 1972. The main proponents of the AICUZ program, the Air Force and Navy, used measurement methods and prediction data assembled by the scientific community from many years of research into civilian aircraft operations to develop a program that accurately evaluated and predicted the accident and noise-impact potential of military aircraft operations.

The Army did not participate in the AICUZ program because (1) it did not have a large inventory of high performance, "noisy" aircraft and (2) the data base necessary to predict the noise impact of Army noise sources did not exist in 1973.

The Army's primary noise sources are artillery, demolition, and rotary-wing aircraft. It was only after the Army had developed a reliable data base for predicting the impact of these sources that it could institute the ICUZ programs, which considers both fixed-wing aircraft (addressed in the AICUZ program) and typical Army sources, including rotary-wing aircraft.

The AICUZ program has been used successfully by the Air Force and Navy to discourage the development of incompatible land uses near their airfield boundaries. ICUZ will be used in the same way by the Army. Even though most of the Army's noise-producing sources cannot, like aircraft, physically intrude into off-installation areas, the apparent willingness of the courts to extend the definition of trespass to include far-field noise effects means ICUZ probably will be implemented in the same way as the established AICUZ program. It is vital, then, for those interested in duplicating the success of the AICUZ program to look carefully at its goals, structure, and implementation methods.

Goals

The AICUZ program has four goals:

1. To decrease the possibility of a major catastrophe from an aircraft accident.

2. To prevent incompatible development in noise-impact and accident-potential areas.

3. To help local authorities protect and promote the public health, safety, and welfare of area inhabitants.

4. To prevent, through compatible land-use planning and control, the compromise of an installation's ability to carry out its mission.[24]

The AICUZ program is justified on the basis of protecting and promoting the public health, safety, and welfare and by providing local governmental bodies with technical information on which suitable land-use actions can be taken.[25] The program addresses the health aspects of noise exposure, the safety considerations of potential aircraft accidents, and the welfare application of environmental quality, energy conservation, and economic stability as related to public funds and the soundness of the local economy.[24]

With the AICUZ program, DOD's intention is to reduce and control flight noise by using all reasonable, economical, and practical measures. Each air installation must do a detailed study of flight operations, conduct noise and safety surveys, and project future flying activities to:[25]

1. Determine any desirable restrictions on land use due to the air installation's noisy characteristics and flight safety.

2. Identify current and potential incompatible land uses.

3. Indicate desirable forms of development for various tracts of land.

4. Estimate land value for the zones in question.

5. Review the airfield master plans to ensure that existing and future facilites are sited consistent with DOD policies.

6. Consider joint use of airfields by the military services whenever such use will maintain operational capabilities while reducing noise and real estate and construction requirements.

7. Include recommendations for cooperating with local government offices and boards, keeping land

acquisition to a minimum, relocating air installations, and taking other actions founded on the study's results.[25]

The DOD requires military services to coordinate AICUZ studies with all area planning and regulatory agencies and to cooperate with local, state, and Federal agencies to arrive at compatible land uses. These studies serve as the basis for land acquisition and disposal at military airfields.[25]

Structure

Each air installation compatible use zone (AICUZ) is comprised of potential high-accident and high-noise areas. These areas may overlap in varying degrees. The AICUZ is identified when accident and noise zones are overlayed on a land-use map of the installation and its environs. Land-use objectives or compatibility guidelines for each AICUZ are then listed as a guide for local planners. The size and shape of each AICUZ depends on the air installation's mission, the type of aircraft used at the installation, the installation's flight traffic volume, and its runway layout.

Accident Potential Zones

Runways are classified in the AICUZ program into two categories: one for light aircraft (Class A) and one for heavy or high-performance aircraft (Class B). Three accident potential zones (APZs) extend from each end of a runway according to the degree of accident potential:

High (clear zone, cz)

Significant (Zone I)

Measurable (Zone II).

Air Force APZs are usually rectangular, since most Air Force planes are transport aircraft which have a long and straight descent approach.

Navy clear zones include the entire runway and generally curve away from the runway to end in a fan shape, since most Navy planes are small and maneuverable, can come in from a number of angles, and need only a short descent approach. By regulation, Navy APZs are shaped to indicate the accident potential of each individual installation. Thus, Navy clear zones are shaped according to the types of planes flown in each zone.

Noise Zones

Noise zones are identified by measuring the Day-Night Average Sound Level (DNL) of aircraft operations in and around the air installation. DNLs can be plotted for an installation and its environs in the same way elevations are plotted on a topographic map. The result is a concentric noise contour map of the installation's average noise levels.

The DNL is the Federal standard for measuring sound levels. In most cases, a DNL of 65 or higher which falls over a noise-sensitive land use like a residential development or a hospital indicates that a noise-impact problem exists. For AICUZ land-use planning, noise contours are plotted for DNLs of 80, 75, 70, and 65. In California, the DNL 60 contour is plotted and given separately to local officials. For AICUZ on-installation siting, the DNL 85 contour is plotted.

Noise DNLs are divided into Zones 3, 2, and 1 in the AICUZ program to indicate decreasing noise intensity:

Zone 3: areas in which the frequency and intensity of noise exposure greatly restricts the use of the area for human activity. The noise level is at least DNL 75.

Zone 2: areas in which certain activities (commercial or industrial) are compatible. Other uses may sometimes be permitted, but are generally incompatible with the noise levels between DNL 65 and 75.

Zone 1: areas in which the noise levels do not pose any hazard; thus, no use restrictions are necessary. The noise level is below DNL 65.[25]

Development

DOD realizes that the AICUZ program alone cannot prevent incompatible development. Success depends on the cooperation of the community. AICUZ is implemented through the police power delegated by state enabling legislation to local governments. It is the intent of the Air Force and Navy to encourage the incorporation of the AICUZ program into the overall land-use planning and control process, rather than to create a separate set of regulations applicable only to air installations and their environs. Federal, state, and regulatory agencies also are encouraged to use AICUZ program objectives and recommendations in their activities. AICUZ

program studies are submitted to the local government, Federal, state, and regional agencies for consideration, adaptation, and implementation.[26,27] To understand what is actually being submitted, it is necessary to understand how the AICUZ program is developed.

A six-phase process is involved in the AICUZ program:

Phase I: Survey and Data Collection. Phase I data include the number of flights, runway utilization, and the time of day of the flights and other flight information.

Phase II: Review and Refinement of Phase I Results.

Phase III: Preparation of Noise Contour, Accident Potential, and AICUZ Maps.

Phase IV: Preparation of AICUZ Studies. Phase IV data include an inventory of lands within the APZs and clear zones, the designation of current incompatible uses, and land-use control recommendations.

Phase V: Presentation of the AICUZ to and Implementation by the Local Governments.

Phase VI: Maintenance of the AICUZ program. Phase VI updates the AICUZ program studies from Phase IV, including any changes that have taken place on the installation.[24,26,27]

The criteria used to develop the overall AICUZ program are:

1. The program must be consistent with up-to-date, valid land-use planning procedures and principles.

2. The program must be comprehensive and must encompass the total area affected by aircraft operations and allow a full range of realistic land uses.

3. The program must be flexible enough to be adapted to state law and local conditions.

4. The program should be used as a part of an overall, comprehensive planning process.

5. The program must help protect and promote public health and safety and welfare, yet be reasonable in its size and shape so it can be tailored to fit present and future aircraft operations. By using different zones, impacted land can be identified well enough to allow the maximum number of possible land-use alternatives to be considered.

6. The program cannot be arbitrary. It must fit local conditions and have a rational basis.

7. The program must be consistent with and implemented through a set of established land-use policies.[24]

Supplements

All AICUZ program studies are developed after each installation has reduced its APZs, clear zones, and noise zones as far as possible by using all the reasonable accident and noise source control methods available, including:

1. Modifying approach procedures.

2. Reducing climbing speeds.

3. Restricting afterburner use.

4. Eliminating night operations.

5. Changing flight patterns.

6. Limiting the number of aircraft in training patterns.

7. Acquiring acoustical enclosures, noise suppressors and engine test cells.

8. Relocating engine run-up stands.

9. Curtailing night engine run-ups.[25]

Disclosure Liability

An important question that must be considered in regard to an AICUZ program is how the military responds to residents and developers who request compensation for alleged reductions in property values because of the release of an AICUZ study. Because AICUZ guidelines are intended to be used in the planning process, there is no intent that the guidelines should apply to existing land uses.[24] The only exception is the clear zone, where there should be no development at all. Release of planning information for local use does not make the Air Force liable for compensation. Any action taken is by the local authorities. Such local action could be questioned as to valid use of authority regarding zoning,

building codes, etc. These decisions must be made by state courts. Public release of suggestions does not mean the military is liable. If overflight noise is sufficient to diminish property values, the Air Force or Navy could be liable under inverse condemnation if the overflights could be proved to constitute trespass. However, if the character of the operation has been unchanged for more than 6 years, any claim is barred by statute of limitations and compensation is not due.[24]

There are difficulties in using the statute of limitations. If the home was sold to a new buyer, the 6-year limit begins anew. There is also the question of whether the 6-year period is in effect from the beginning of the action or starts when damage is first realized. Congress has not passed any legislation that authorizes administrative settlement of claims for reduction in property values. Therefore, claims must be filed in United States District Court or Court of Claims.

Implementation

During the implementation phase of the AICUZ program, the air installations must interact with the local governments of the communities near the installation. Activities that are the responsibility of the installation can be organized into four phases tied to the release of the AICUZ study.[27]

Phase I: actions before the release of the AICUZ program study or amendment.

Phase II: actions during the release of the study or amendment.

Phase III: actions immediately after the release of the study or amendment.

Phase IV: monitoring the implementation.[27]

Phase I

Before the AICUZ study is released, the local government entities and officials, interest groups, landowners, and state and Federal government agencies and officers who will be interested in the study's results must be identified. This will save valuable time later. This "special interest" list should be updated when new decision-makers are elected or appointed. The community's decision-making structure, both official and unofficial, should be determined, including influential individuals or groups (i.e., non-elected community leaders).

After important community contacts are listed, the installation should: (1) discuss program concepts and objectives with local government agencies to acquaint them with the program and determine their attitude toward it, (2) determine what local or state legal authority is necessary to change land-use documents, (3) develop an AICUZ implementation and maintenance plan, and (4) develop a dynamic public relations program.

Phase II

When the study is released, the installation should conduct a public hearing to explain the program's goals and its study results. Copies of the study results should be given to all key interested parties, including local, state, and Federal agencies, and A-95 Clearinghouses.

Phase III

After releasing the study, the installation should present its land-use compatibility recommendations to the special interest groups identified in Phase I. These recommendations should be limited to the type of land uses considered compatible with the various noise zones, and the rationale behind the recommendations:

After local public officials have reviewed the study results, informal meetings between public officials and the installation should be held to determine what plans have been made to implement the program's recommendations. If the local governments have made no plans, the installation may offer suggestions.

Phase IV

The installation should develop a system for monitoring the actions taken by the community. A schedule of key events involved in the program's implementation should be obtained by the installation. This schedule will help the installation keep track of meetings in which it would like to participate as well as allowing it to see how the actions are progressing.

The installation should watch for any development proposals submitted that may be incompatible with the activities of the installation. Many sources can be used for this task, including:

1. Local, regional, and state plans.

2. Zoning or planning board announcements.

3. Local radio announcements and articles and public notices in newspapers.

4. A-95 Clearinghouse newsletters.

5. Advisory committee meetings of county and regional planning agencies.

6. Discussions with local planners, real estate brokers, utilities, bankers, developers, chamber of commerce, and economic development agencies.

7. Discussions with community leaders.[27]

Proposals that can result in inappropriate development can include:

1. Requests to the planning board for rezoning or variances to allow an incompatible use or a higher density in an already impacted area.

2. Request for approval of a subdivision plat.

3. Site selection for a noise-sensitive community facility (e.g., schools, hospitals).

4. Request for street map approval.

5. Request to a utility for new hook-up.

6. Coastal or wetland permit applications.

7. Financial assistance requests to state or Federal agencies.[27]

After an incompatible use has been identified, the installation should oppose the approval of the request or permit in the appropriate public forum. Appearances at public meetings should be made by qualified installation personnel and should be coordinated through the Public Affairs Office (PAO) and the Staff Judge Advocate Office.

Key Factors

For any military/civilian cooperative land-use planning program like AICUZ or ICUZ to work, each installation must carefully monitor and coordinate each program step. Installation offices directly involved in the AICUZ or ICUZ program include Master Planning, Staff Judge Advocate, Environmental, Range Control, and Real Property.

Coordination

It can be difficult to establish a single coordinating office for programs like AICUZ or ICUZ because of the many offices involved in developing, implementing, and monitoring the program. If only one office is responsible for implementing the program (e.g., Master Planning or Environmental), there may be a lack of expertise in one or more areas vital to the program's success.

To avoid this problem, a team approach might be adopted. In this way, the program can draw on the resources of many installation offices. This team would have one representative from each office who would coordinate their office's area of responsibility in developing and implementing the program.

Office Responsibilities

PAO. Any type of hearing or briefing must be coordinated with the PAO. The PAO also issues news releases and writes memoranda of understanding between the installation and the local governments.

Staff Judge Advocate. This office checks enabling legislation, reviews and evaluates local ordinances, and helps draft ordinances or legislation needed for the program's implementation. This office should be consulted before the installation attends public hearings and should be informed of any briefings scheduled by the installation.

Range Control. The Range Control office keeps the program team informed on the type and frequencies of training occurring on the installation and helps the team handle training-related complaints.

Real Property. As the real estate authority for the installation, this office will coordinate program actions involving the sale or purchase of land. This office works closely with local governments, and is an excellent source of community-contact information.

Environmental. This office reviews Environmental Impact Analyses and Statements and all training range relocations. Because noise is considered a form of pollution, this office may have already established many community contacts the program team can use during the first phases of the AICUZ or ICUZ program.

Master Planning. This office makes land-use recommendations and works with local and regional planners to achieve compatible uses. It also monitors on-installation activities that could impact land outside the installation, as well as off-installation activities.

5 CONCLUSIONS

1. The legal precedents involving noise-based annoyance and damage claims caused by airport or blast activities indicate that litigation can be avoided only by the concerted enactment of the ICUZ program.

2. The most easily enacted land-use controls applicable to ICUZ and which affect large land areas are (a) zoning and capital improvement, and (b) easements and trusts.

3. The AICUZ program review identified the following critical factors for a successful, cooperative noise-impact control program between an installation and its surrounding communities:

a. Use a broad team approach to develop the ICUZ program.

b. Maintain a working relationship between the installation and local land-use planning offices and elected officials.

c. Rely on an energetic public relations program to prevent negative community reaction to Army initiatives.

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ATTN: Chief, SADEN-TS
Huntsville 35807
ATTN: Chief, HNDED-CS
ATTN: Chief, HNDED-SR
Ohio River 45201
ATTN: Chief, Engr Div
Missouri River 68101
ATTN: Chief, MRDED-T
Southwestern 75202
ATTN: Chief, SWDED-T
South Pacific 94111
ATTN: Chief, SPDED-TG
Pacific Ocean 96858
ATTN: Chief, Engr Div
North Pacific 97208

6th US Army 94129
ATTN: AFKC-EN

7th Army Comb. Trng. Cntr. 09407
ATTN: AETTM-HRD-EHD

Armament & Dev. Command 21005
ATTN: DRDAR-BLT

USA ARRADCOM 07801
ATTN: DRDAR-LCA-OK

DARCOM 22333
ATTN: DRCPA
ATTN: DRCIS-A

TRADOC
Ft. Monroe, VA 23651

Ft. Clayton, Canal Zone 34004
ATTN: DFAE

Ft. Detrick, MD 21701

Ft. Leavenworth, KS 66027
ATTN: ATZLCA-SA

Ft. McPherson, GA 30330 (2)

Ft. Monroe, VA 23651 (6)

Ft. Rucker, AL 36360 (2)

Aberdeen Proving Ground, MD 21005
ATTN: DRDAR-BLL
ATTN: STEAP-MT-E

Human Engineering Lab. 21005 (2)

USA-WES 39181

Army Environmental Hygiene Agency 21005

Naval Air Station 92135
ATTN: Code 661

NAVFAC 22332 (2)

Naval Air Systems Command 20360

US Naval Oceanographic Office 39522

Naval Surface Weapons Center 22485
ATTN: N-43

Naval Undersea Center, Code 401 92152 (2)

Bolling AFB, DC 20332
AF/LEEEU

Patrick AFB, FL 32925
ATTN: XRQ

Tyndall AFB, FL 32403
AFESC/TST

Wright-Patterson AFB, OH 45433 (3)

Building Research Advisory Board 20418

Transportation Research Board 20418

Dept of Housing and Urban Development 20410

Dept of Transportation Library 20590

Illinois EPA 62706 (2)

Federal Aviation Administration 20591

Federal Highway Administration 22201
Region 15

NASA 23365 (2)

National Bureau of Standards 20234

Office of Noise Abatement 20590
ATTN: Office of Secretary

USA Logistics Management Center 23801

Airports and Construction Services Dir
Ottawa, Ontario, Canada K1A 0N8

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National Defense HQDA
Ottawa, Ontario, Canada K1A 0K2

Engelman, Lynn Anne
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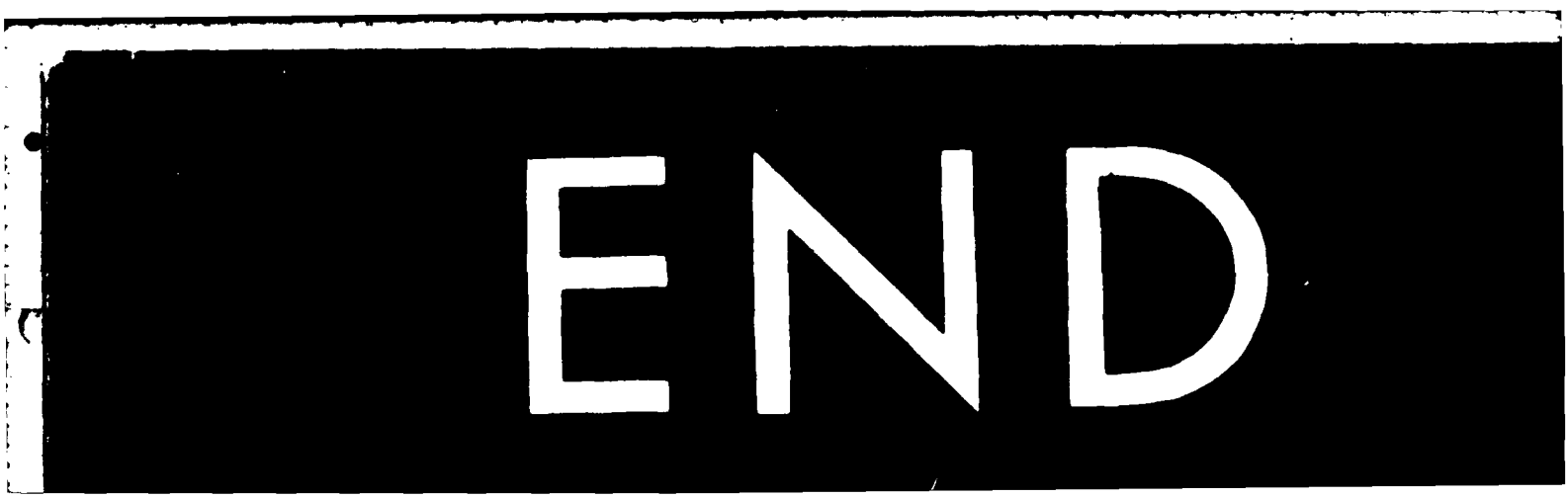
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